

WHAT IS CLAIMED IS:

1. A system for treating a workpiece, comprising:
  - a robot having a holder for holding the workpiece and traversing the workpiece
  - 5 along a predetermined path;
  - a treatment device for performing a treatment on the workpiece, the treatment device having a treatment tool for contacting the workpiece at at least one point along the path;
  - a contact force measurement device for providing information on the actual
  - 10 contact force between the treatment tool and the workpiece;
  - a position measurement device for providing information on the actual position of the treatment tool; and
  - a controller in communication with the robot and the treatment device for controlling the system in accordance with predetermined position data and
  - 15 predetermined contact force data, based on the predetermined path of the workpiece, the controller being responsive to the actual contact force information and the actual position information, the controller receiving the actual contact force information from the contact force measurement device and the actual position information from the position measurement device.
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2. A system of claim 1, further comprising a robot instructor in communication with the robot for instructing the robot along the predetermined path, under the control of the controller.
- 25 3. A system of claim 1, wherein the controller uses the predetermined position data to control the robot.
4. A system of claim 1, wherein the controller uses the predetermined contact force data to control the treatment device.
- 30 5. A system of claim 1, wherein the controller is a computer.
6. A system of claim 1, wherein the treatment tool comprises a blending wheel.

7. A system of claim 1, wherein the contact force measurement device is mechanically attached to at least one of the holder and the treatment device.
- 5 8. A system of claim 1, wherein the contact force measurement device comprises at least one of a force sensor attached to the robot, and a force gauge attached to the treatment device.
9. A system of claim 1, wherein the position measurement device is mechanically  
10 attached to the treatment device.
10. A system of claim 1, wherein the position measurement device comprises at least one of a force gauge and a displacement sensor.
- 15 11. A system of claim 1, wherein the workpiece comprises a turbine blade.
12. A system of claim 1, further comprising a decoupling mechanism in communication with the controller and mechanically attached to the treatment device for adjusting the position of the treatment device and the contact force between the treatment  
20 tool and the workpiece.
13. A system of claim 12, wherein the decoupling mechanism comprises an actuator and a cam.
- 25 14. A system of claim 1, further comprising a database for storing the predetermined data.
15. A system of claim 1, further comprising an optical sensor for scanning the surface of the workpiece and providing profile data of the workpiece for determining the  
30 predetermined path.

16. A system of claim 15, wherein the optical sensor comprises a laser emitting sensor with a controllable laser beam incidence direction, to be substantially normal to the surface of the workpiece at a scanning point of the workpiece surface.
- 5 17. A system of claim 1, wherein the treatment device is a finishing device and the treatment tool is a finishing tool.
18. A system of claim 1, for surface finishing a workpiece.
- 10 19. A method of treating a workpiece, comprising:  
 holding and traversing the workpiece along a predetermined path;  
 performing a treatment on the workpiece by way of a treatment tool at at least one point along the path;  
 determining the actual contact force between the treatment tool and the  
 15 workpiece;  
 determining the actual position of the treatment tool; and  
 controlling the system in accordance with predetermined position data and predetermined contact force data, based on the predetermined path of the workpiece, in response to the determined actual contact force and the determined actual position  
 20 information.
20. A workpiece which has been treated according to a method comprising:  
 holding and traversing the workpiece along a predetermined path;  
 performing a treatment on the workpiece by way of a treatment tool at at least  
 25 one point along the path;  
 determining the actual contact force between the treatment tool and the workpiece;  
 determining the actual position of the treatment tool; and  
 controlling the system in accordance with predetermined position data and  
 30 predetermined contact force data, based on the predetermined path of the workpiece, in response to the determined actual contact force and the determined actual position information.